University of California ANR Grain and Forage Sorghum Variety Trials

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Introduction

Sorghum [*Sorghum bicolor* (L.) Moench] is the fifth most globally important cereal crop, ranking behind rice, maize, wheat, and barley. Grain and forage sorghums are used for animal feed for dairy and beef industries, in the pet food and for bird seed, for feed in pork and poultry production. Sorghum is a candidate for renewable fuels and specialty chemicals industries, and have found uses in food systems, gluten-free beer and pastries.

Sorghum has characteristics helpful in adaptation to drought, high temperatures and marginal soils, making it one of the more highly adaptable forage crops in terms of adaptation to climate change. The majority of US grain sorghum production is in Kansas and Texas, with limited production in California. Forage sorghum may have a better fit in CA. California is expected to have expanding needs for adaptable crops well-suited to deal with limited water supplies and deficit irrigation, in a crop with relatively few needs in pest and disease management. Research at University of California is being conducted at UC Davis, UC-Kearney and UC-West Side Research and Extension Centers.

UC Research Projects

1. Forage and Grain Sorghum Variety Trials (UCD, West Side and Kearney REC's)
2. Joint BioEnergy Institute/UC sorghum transgenics field trials.
3. Bacteria Enrichment patterns in the Root endosphere of drought-stressed sorghum
4. Deficit irrigation impacts on forage quality & composition for bioenergy use.

Fig 1: Forage biotypes *(can differ in height, duration of growth/maturity timing, timing and size of panicle development, BMR and brachytic characteristics)*

Results: Forage and Grain Sorghum performance trials in 2022

Table 1. Various agronomic and yield characteristics for grain sorghum hybrids (averages for each site shown for 3 trial locations in California in 2022, Kearney, Westside, and UC Davis Farm locations.

Hybrid Information			Grain Yields bu -1		
Entry	**Company**	**Hybrid**	**Kearney**	**West side**	**UC Davis Farm**
1	Dyna-Gro	M59GN94	78.51	147.27	137.94
2	Dyna-Gro	M60GB31	75.22	142.86	115.64
3	Dyna-Gro	M63GB78	84.49	133.79	104.23
4	Dyna-Gro	M67GB87	98.63	162.05	99.82
5	Dyna-Gro	M71GR91	103.34	161.53	109.41
6	Dyna-Gro	M72GB71	81.36	134.05	117.19
7	S&W Seed	SP7715	53.82	174.49	109.41
8	S&W Seed	SP72M42	79.42	127.56	82.97
9	S&W Seed	SP78M42	89.1	145.2	144.94
10	S&W Seed	NK8828	68.87	123.93	102.67
11	S&W Seed	SPSD455	75.98	140.27	119.79
	Means		**79.85**	**143.51**	**114.21**
	CV		**18.85**	**14.54**	**22.42**

Table 2. Summary of key forage characteristics by type of forage grown at three locations, Kearney, West Side and Davis in 2022. Abbreviations are shown in the footnote.

Sorghum Type (number of cultivars)[1]	% Lodging @ Harvest[2]	Silage Yield (T/A) @65% Moist.[2]	% Crude Protein[2]	% ADF[2]	% NDF[2]	% Lignin[2]	% NDF D30[2]	% NDF D240[2]	Milk lbs/ton DM[2]	Relative Feed Quality (RFQ)[2]
PS (2)	0.28 c	33.78 a	6.32 b	40.79 a	62.97 a	5.12 a	49.05 b	66.40 a,b	2476.44 b	87.10 d
PS-BMR (7)	12.70 b,c	27.29 b	7.36 a	38.56 b	57.85 b	4.08 b	53.68 a	67.67 a	2556.13 b	105.11 c
FOR-NON (17)	24.62 a,b	26.37 b	7.31 a	33.68 c	50.52 c	4.14 b	47.38 b	63.54 c	2808.98 a	114.69 b
FFOR--BMR (9)	34.75 a	23.52 c	7.54 a	32.50 c	49.20 c	3.51 c	51.95 a	65.59 b	2870.64 a	126.74 a
Average	23.47	26.25	7.32	34.74	52.32	4.02	49.86	65.03	2756.27	114.3

[1]Number in parenthesis is the number of cultivars for each sorghum type. PS-BMR = Photoperiod-sensitive brown mid-rib; PS = Photoperiod sensitive; FOR-BMR=Forage brown mid-rib type; FOR-NON= forage type. [2]Means followed by the same letter do not significantly differ using LSD (P=0.05)

Table 3. Top yielding hybrids that yielded over 24.0 tons acre^{-1} averaged over the three sites for the University of CA Forage sorghum Trials in 2022.

Hybrid	Company	Maturity	BMR	% Lodging	Ton ac^{-1} 65% Moist	240 hr NDFd	Milk Lbs ton-1	Rel. Forage Quality
A11003/F17300	Rooney	PS	NO	0.00 l	34.49 a	66.08 b-i	2542.9 j-m	92.30 n-q
TX08001	Rooney	PS	NO	0.56 l	33.08 a,b	66.73 b-g	2410.0 m,n	81.91 q
Fullgraze II	Dyna-Gro Seed	ML	NO	0.00 l	31.89 a-c	65.54 c-l	2501.7 k-m	86.52 o-q
Hybrid X54243	Scott Seed Co.	MED	NO	0.00 l	30.93 a-d	66.65 b-h	2477.2 l,m	84.66 p,q
SS405	S&W Seed	ML	NO	12.22 h-k	30.54 a-e	62.66 m-p	2777.8 d-i	103.96 k-n
Z-1310 PPS	Zinma Seed	PS	YES	7.78 i-l	29.47 b-f	67.44 a-d	2368.8 m,n	88.14 o-q
Fullgraze II BMR	Dyna-Gro Seed	ML	YES	17.78 f-i	28.87 b-g	66.70 b-h	2674.6 g-k	106.32 j-m
Super Sile 20	Dyna-Gro Seed	ML	NO	62.22 b,c	28.76 b-h	62.95 m-p	2649.9 h-l	101.91 l-n
Hybrid X50652	Scott Seed Co.	PS	YES	0.00 l	28.51 b-h	69.76 a	2387.7 m,n	101.24 l-n
SFS Star	Dyna-Gro Seed	E	NO	60.00 c	28.47 b-h	64.15 h-p	2767.8 d-i	109.43 i-l
Hybrid X50665	Scott Seed Co.	MED	YES	0.00 l	27.68 c-i	65.67 c-k	2869.7 b-e	131.91 b,c
Hybrid X52053	Scott Seed Co.	MED	NO	2.22 k,l	27.68 c-i	64.52 f-n	2896.0 b-e	122.74 c-h
SweetTon MS	Dyna-Gro Seed	ML	NO	26.67 e,f	27.43 c-j	65.18 c-m	2924.1 a-e	122.34 c-h
F72FS05	Dyna-Gro Seed	ME	NO	0.00 l	27.25 c-j	64.91 d-m	2819.4 d-h	115.79 g-k
Super Sweet 10	Dyna-Gro Seed	M	NO	26.11 e,f	27.20 c-j	61.96 n-p	2844.7 c-g	114.70 h-k
NK300	S&W Seed	ME	NO	20.56 f-h	27.11 c-j	61.59 p,q	2826.6 d-g	119.34 d-i
Super Sile 30	Dyna-Gro Seed	ME	NO	71.11 b	26.52 d-k	63.16 k-p	2632.7 i-l	98.81 l-o
SP3905 BD BMR 1	S&W Seed	ME	YES	2.78 k,l	26.48 d-k	63.09 l-p	3022.3 a,b	143.69 a,b
Danny Boy II BMR	Dyna-Gro Seed	PS	YES	63.33 b,c	26.24 d-l	68.62 a,b	2262.4 n	96.85 m-p
SPBD703	S&W Seed	E	YES	0.56 l	26.21 d-l	63.44 j-p	2941.7 a-d	129.59 c-e
Dynagraze II BMR	Dyna-Gro Seed	ME	YES	23.89 f,g	25.77 e-m	67.28 a-e	2919.6 a-e	120.15 c-i
SP1792 MS	S&W Seed	M	NO	36.67 d,e	24.76 f-n	64.52 f-n	2693.4 f-j	106.81 j-m
Z-1220 BMR	Zinma Seed	ML	YES	85.56 a	24.65 f-n	64.22 g-o	2754.9 e-i	116.65 f-j
SP3905 BD BMR 2	S&W Seed	ML	YES	0.00 l	24.18 g-n	67.73 a-c	2858.6 b-f	130.35 c,d
Hybrid X52265	Scott Seed Co.	MED	NO	1.11 l	24.05 h-n	64.40 f-o	2884.7 b-e	124.82 c-h

Hybrid information provided by seed companies. Under type, F=Forage sorghum. Under Maturity, E=Early, F=Full, ME=Medium Early, MF=medium Full, M=Medium, ML=Medium Late, L=Late, PS=Photoperiod Sensitive.

This and previous reports can be found at the sorghum website, www.sorghum.ucanr.edu